

FROM e-HERITAGE TO INTERPRETIVE ARCHAEOLOGY SYSTEMS (IAS):

A RESEARCH FRAMEWORK FOR EVALUATING CULTURAL HERITAGE COMMUNICATION IN THE DIGITAL AGE

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Abstract

The principal purpose of this paper is to examine which research approaches are best suited for determining the requirements of the next generation of interactive interpretation support systems for cultural heritage site. We are optimistic that such systems if properly designed to exploit the potential of advanced information and communication technologies (ICTs), can not only meet, but even exceed visitor-user expectations. The research framework proposed to achieve this ideal integrates insights from both Interpretive Archaeology and interpretive IS research. We call the application of ICT's in systems for communicating cultural heritage information "e-Heritage Systems or e-HS. We define "Interpretive Archaeology Systems"(IAS) as a subclass of e-HS, the design of which is informed by hermeneutics and phenomenology. Therefore, the principal purpose of the paper is to promote a shift from e-HS to IAS. To illustrate the fruitfulness of our preferred approach for IAS requirements identification, we derive a set of criteria from our research philosophy and apply them to the evaluation of an existing e-HS: the ARCHEOGUIDE in Olympia.

Keywords: *Interpretive Information Systems Research, Interpretive Archaeology, Hermeneutics, Interpretive Archaeology Systems.*

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1 INTRODUCTION

Our research interest in developing a new approach to requirements determination and subsequent logical design of the next generation of visitor oriented support technologies for cultural heritage interpretation developed from a careful reading of the European Commission reports (2001 and DIGICULT 2002). On the one hand, we fully agree with their optimistic assessment that Europe's cultural heritage is "*a unique public asset*" that provides a good basis for "*the development of our content industry in a sustainable knowledge society*" (European Commission 2001, p. 1). Heritage tourism is an economically important industry with Europe commanding a larger market share of international tourism *arrivals* than North America (57% versus 11% in 2003). However, Europe's *revenue receipts* per arrival are behind North America's (620 euros versus 970 euros). In fact, even though France, Spain and Italy were the worlds 1st, 2^d and 4th cultural tourism destinations in 2003, their tourism receipts lag even further behind the USA (WTO 2004). One reason for this could be that the Americans from the very start of designing their national monuments and museums have put much more emphasis on good interpretive services than the Europeans who emphasized more the academic research functions of museums and other cultural assets. We also agree that DIGICULT 2002 takes an important step into the right direction by emphasizing the new broadband and always-on wireless ICTs (*information and communication technologies*) as an enabler for reaping the benefits, economic, political and cultural, of Europe's cultural heritage as a tourism and historical-socio-political asset. Cultural heritage communication will have an important role to play to improve solidarity and political consensus formation in the ever more diverse European Community. The progressive technical perspective of the European Commission is also shared by the research community focusing on applying ICTs to Archaeology (for instance, CAA - Computer Applications to Archaeology 2004, or ACM-VAST 2001).

However, we are very disappointed that the European Commission reports appear to embrace an inadequate and outdated approach to identifying the legitimate user-visitor needs for better interpretive services. The new always on and wireless technologies provide a great chance to convert Europe's competitive advantage in cultural heritage contents into a revenue stream of similar magnitude per visitor as the USA have achieved. However, we are deeply concerned that the substantial investments needed to bring new technology based interpretive user services on stream will be wasted, if their design is based on an inadequate and outdated approach to requirements determination. The extensive literature in IS (information systems) research on organizational implementation failures (in IS dating back at least to Bostrom and Heinen 1977) clearly speaks against the mechanistic approach underlying the European Commission reports. In particular, we see three issues with these approaches: technological determinism, the lack of interpretive Archaeology research, and the lack of recognizing the implications past implementation failures and interpretive information systems research.

- Both the European Commission and the ICT in Archaeology research community are oriented towards technological determinism (Markus and Robey 1988) because they are not informed by

socio-cultural frameworks for analyzing the expectations of the cultural site users, i.e. for identifying the needs and interests of the public visiting museums and archaeological sites. Even if the expectations of the users are acknowledged as important they are not an object of research. Rather, a direct relation between ICT and the understanding of archaeology findings is assumed. This raises critical research questions for the evaluation and design of proper information systems (IS) that will reap the potential benefits of modern ICT for both the archaeological research community and its “clients”: the general public interested in understanding the past.

- The second issue is that neither the Commission nor the ICT in Archaeology research include the new research theories in Archaeology known as “Interpretive Archaeology”. The point is that this Interpretive Archaeology could provide useful theories and methodologies about the expectations of public about ICT in cultural heritage.
- The third is that none of the three approaches above appear to be aware of the bitter lessons learnt from the classical organizational implementation failures literature or the more recent advances of IS research in the interpretive paradigm. If the mainstream in IS research is still positivism, a very important alternative approach, interpretivism, could be especially relevant for the study of IS users. Moreover, there is a common ground between Interpretive Archaeology and Interpretive IS research, i.e. the application of two research approaches: hermeneutics and phenomenology

The principal purpose of this paper is *to introduce the critical epistemological questions raised by meeting user expectations when applying ICT to better communicate cultural heritage meanings to visitors (users)*. The second purpose is to point the way to an *appropriate research framework* for addressing visitor expectations by building on the insights from both interpretive Archaeology and Interpretive IS research. *We are calling the application of IS to communicating cultural heritage “e-Heritage Systems” or e-HS.* We shall then refer to e-Heritage Systems informed by the philosophy of hermeneutics and phenomenology as “Interpretive Archaeology Systems” (IAS). Therefore, the perspective is to promote a shift from the current e-Heritage Systems to Interpretive Archaeology Systems.

The remainder of this paper will proceed as follows. Section 2 will present the status of ICT applications in archaeology through the European commission perspective and through a trend of the academic perspective of the Computer Applications to Archaeology. Section 3 will present the research trends in Information Systems and in Archaeology. Section 4 outlines a framework for the evaluation of ICT applications in Archaeology based on Interpretive perspectives and applies it to the evaluation of the ARCHEOGUIDE system in Olympia.

2 TWO VIEWS OF ICT APPLICATIONS TO CULTURAL HERITAGE

The European Commission perspective is presented in a first sub-section and the ICT applications in Archaeology in a second one.

2.1 The European Commission perspective

In the main European Commission’s report on “New technologies for Cultural and Scientific Heritage” ICT, and especially Virtual Reality and mobile technologies are expected to provide visitors *“an impressive, immersive, interactive and involving product.”* (p. 95). And to give a *“sense of personal presence of the user in its environment”* (p. 114). The European Commission is oriented towards technological determinism. The analysis does not start from the user but from ICT features. It fails to apply any systematic methods for information systems requirements analysis.

2.2 The academic perspective on ICT in Archaeology

There are so numerous publications in ICT applications to Archaeology in academic journals like *Internet Archaeology* (for instance, Gillings and Goodrick, 1996) or more general frameworks for interpretations (Hodder 1996) that, due to space limitations of this ECIS conference paper, we propose to focus only on the last CAA (Computers Application to Archaeology) conference (CAA 2004). In this conference, among a majority of technological sessions, there was one session on “museums and public archaeology presentation” where the following question was raised “*How do we approach the visitor? Ddo we translate all this into a story, even into an experience?*” (Plentickx, 2004, p. 14). There were other communications including interpretation issues (Frischer 2004, Forte 2004), but they were oriented more towards the archaeologist scientific concerns than towards the public. The point is that neither the European Commission nor the CAA community refer to interpretive research theories in Archaeology or in IS.

3 INFORMATION SYSTEMS RESEARCH AND ARCHAEOLOGY

The first sub-section will present the different trends in IS research. The different theoretical trends in Archaeology will be presented in a second sub-section. The third will introduce Interpretive Archaeology. Finally, the forth sub-section will present a common trend in IS interpretive research and interpretive archaeology : Heidegger’s phenomenology.

3.1 Information Systems research trends

Information Systems research is often described as composed of three epistemologies: positivist, interpretive and critical social theory. Positivism represents the natural sciences of social sciences. In contrast, interpretivist research in IS focuses on social interactions and meaning. In the IS discipline, hermeneutics (Gadamer 1975) and phenomenology (Heidegger, 1962) have been presented as an important approach for more than 20 years (Boland 1985). It is part and parcel of interpretive field studies (Klein and Myers 1997) in particular. Finally, a third trend is represented by Critical Social Theory that has an emancipatory ideal based on the Theory of Communicative Action (Habermas 1984).

3.2 Archaeology research trends

The current theoretical debate focuses on the opposition between *processual archaeology* and the different alternatives.

- The classical processual archaeology focus on the idea of “functions” and has been launched in the 1950’s by White (1959), Steward (1955) and Wiley and Philips (1958). Although the authors focus on anthropology, the object is strictly considered as a material one. This is consistent with “historical objectivity” (Ranke, 1957), which aims at showing “*only what has truly been*” (p. 4).
- The second trend, system archaeology, or the “New Archaeology” (Binford 1972), is based on Hypothetico-deductive logic. Quantitative methods, especially statistical are used in this trend.

Therefore, the two trends of processualism can be considered as positivist.

Many recent theoretical trends presented themselves as a critique of processualist archaeology:

- Postcolonial archaeology Gosden (2001) and gender archaeology (Gilchrist 1999) seek to give a voice to the forgotten groups.
- Structuralist archaeology (Leroi-Gourhan 1965), under the influence of Levy-Strauss (1963) considers archaeological objects as signs meaningfully constituted. Post-structuralist archaeology (Johnson 1999), following Foucault (1972) and Bourdieu (1977) claims that the main discourse about archaeological artefacts is linked to a dominant power.
- Structurationnist archaeology (Shanks and Tilley 1982), referring to Giddens (1979) and Latour (1999), considers the archaeological object as the product of situated intention. Most of the post-

processual archaeology trend, especially post-colonial, gender and post-structuralist archaeology is similar to the application of Critical Social Theory in Information Systems research. Indeed, even if they do not refer to Habermas (1984), they do subscribe an emancipatory ideal, or at least to the importance of social critique.

- Finally, “Interpretive archaeology” will be described in the next part.

These different trends are abstracted in table 1.

<i>Research trend in archaeology</i>	<i>Research trend in IS</i>	<i>Theoretical trend in archaeology</i>	<i>Archaeological objects and monument considered as a...</i>
Processual archaeology	Positivism	“Classical” Processual (anthropological) archaeology	Material object
		Systems archaeology (“ <i>new archaeology</i> ”)	Material object
Post-processual archaeology	Critical Social Theory?	Postcolonial archaeology / gender archaeology	Chance of emancipative discourse
		Post-structuralist archaeology	Discourse representing power
Structuralist archaeology	?	Cultural archaeology , semiotics theory	Sign (meaningfully constituted)
Structurationist archaeology	Structuration theory	Structurationist archaeology, agency theory	Product of situated intention
Interpretive archaeology	Interpretivism	(<i>see below</i>)	(<i>see below</i>)

Table 1. Research trends in Archaeology and in IS

3.3 Interpretive Archaeology

Interpretive archaeology is a recent trend in archaeology, mainly opposed to the processual (positivist) approach (Tilley 1993, Thomas 2000). The main four fundamental concepts of interpretive archaeology are re-enactment, embodiment, hermeneutics and phenomenology. In principle, these could serve as preliminary set of evaluation criteria.

- In the *re-enactment* perspective (Collingwood, 1946), the mission of the historian is to “*think himself into this action, to discern the thought of the agent*” (p. 213). Through “*a priori imagination*” (p. 241), the historian has a double task: to construct a coherent image and to “*construct a picture of things*” (p. 246) through an “*imaginary picture of the past*” (p. 248). Therefore, an historical event “*known historically, survives in the present*” (p. 225).
- The *embodiment archaeology* (Tilley 1994) has strong references to Merleau-Ponty (1962). Some of the objects presented to the public can provide a chance for a bodily experience of the past, like a walk to an ancient court house or temple.
- In *Hermeneutics* (Hodder and Hutson 2003), the social context in which the exhibited objects are embedded becomes central focus of interpretation and thereby the objects offer a chance for a reflexive experience of the past.
- Finally, there is an emerging reference to Heidegger’s *phenomenology* in interpretive archaeology (Holtorf and Karlsson 2000). Building on this literature lead, it is our purpose to introduce the importance of Heidegger’s views on historicity and then clarify its applicability to e-HS evaluation in practice.

3.4 Heidegger’s phenomenology in History and Archaeology

Heidegger, in *Being and Time* (1953, 1996) also takes issue with the objectivist view of history. He compares Ranke’s view of the history to a collector of facts similar as an antiquarian collection piece of furniture from past eras. He criticizes the positivist trend in historical science as a “*mechanistic kind of thinking*” (Heidegger, p. 367) “*At heart they are natural scientists and they become sceptics all the more because there are no experiments.*” (p. 365). For Heidegger, these “representational”

theories of history all focus on the differences between the “historical reality” and the possibility of a science of it. However, they do not grasp the ambiguity of the term history. They seem to recognize only one meaning of the word “history” like when we say, “*this already belongs to history*”. In this figure of speech, the past is no longer objectively present or does not any more have an effect. But history has the opposite significance when we say “one cannot escape history” or that someone “makes history” and therefore will shape the future: “*Whatever ‘has a history’ in this way can at the same time ‘make’ history, in the sense of ‘Epoch making’*” (p. 347). Finally, a fourth meaning of history is related to the conditions of human existence. In opposition to Nature, Humans are considered as beings possessing “spirit” and “culture”. These last two meanings lead to the notion of historicity..

Historicity is “*understanding of ourselves as historical*” (p. 18), i.e. it is the understanding that we are fundamentally historical beings. This distinguishes us from Nature. The meaning of our action, of our existence, is linked to history. Through this meaning, history lives through me and the meaning of my existence comes from history¹. When I am able to justify my action through a reference to history, this is a positive appropriation, for example I might say “Cleopatra would have done the same in this situation”. I understand my being through the being of past characters, like Shakespeare in his historical plays, from *Anthony and Cleopatra* to *Richard II*. The question of the present being is linked to and understanding of the past and the interest in gaining such an understanding prompts the human mind “*inquire into its own historicity*” (p. 18). By doing that, I can come to understand the different possibilities of existence that the historical characters may have had. The phenomenological mission of historiography is to “*disclose the silent power of the possible*” (p. 360) in order to reveal the possible existences compared to the one that finally occurred. Historicity understands the past “*in terms of its possibility*” (p. 360). According to Heidegger, “*Understanding signifies self-projection*” (p. 357)², it is a self-projection towards its “*potentiality of existence*” (p. 360)³. In this situation, I am an “*inquiring being*”⁴, I am authentic towards myself because this is the being that I am in each case, but who however keeps on investigating my possibilities of existence.⁵ Therefore, historicity makes “*the universal manifest in what is unique*” (p. 360). The past is unique, in the sense that it will not happen again. However, historicity goes well beyond “re-enactment” or “re-thinking of an event through a trace”. In the two previous approaches, re-enactment and embodiment historiography, the past is still outside me. They lack the commitment of the self and do not help me to understand myself. They do not give meaning to my existence. In contrast, historicity reveals universal elements of the conditions of human existence. I can come to understand what is universal in a specific situation through self-projection into the possibilities of existence of a past character. This projection helps to understand myself as historically constituted. In addition, as a human being, I am also able to “make history”, or, at least, my own history through heroic actions, for example help a person in an emergency or grasping an opportunity “to make a difference” for the future.

3.5 An Interpretive Framework for the evaluation of e-Heritage Systems

The key question now is how it is possible to capture the essence of the previous discussion of interpretive and phenomenological archaeology (Holtorf and Karlsson, 2000; Tilley, 1993, 1994) in a manageable set of evaluation criteria, which in turn can guide both user requirements elicitation and e-HS evaluation. The three principal theory contributions of interpretive archaeology trends were re-enactment, embodiment, and hermeneutics. In its most recent discussion, the concept of phenomenology also appears, albeit without its application to concrete issues as were outlined earlier with regard to Digicult 2002. Therefore here we have taken the phenomenological foundations one

¹ Historicity allows a “*positive return to the past possible – in the sense of its productive appropriation*” (p. 19).

² “*Understanding signifies self-projection upon the actual possibility of being-in-the-world*” (p. 357)

³ Historiography “*projects Dasein that has-been-there upon its ownmost potentiality-of-existence*” (p. 360).

⁴ That Heidegger calls “Dasein”, usually translated by “to be here”, or “presence”

⁵ the “*being which we ourselves in each case are and which includes inquiry among the possibilities of its being*” (p. 6).

step further by building explicitly on Heidegger's concept of historicity. The implications of our analysis for e-HS evaluation are summarized in table 2.

<i>Criteria</i>	<i>Question for IS evaluation (e-Heritage Systems)</i>
1. Re-enactment	Does the e-HS help the visitors to re-live the historical events in their mind? Does it help them to picture themselves as part of the historical events? Can they grasp the mindset of the historical characters?
2. Embodiment	Does the e-HS give an opportunity of a bodily experience of the past to the visitors?
3. Context	Does the e-HS give an occasion for a "reflexive experience of history"? Which pre-understandings (intuitions) does the e-HS interface presume and does it provide tutorial aids to acquire the necessary background knowledge? Does it lead the user to engage in hermeneutic circles, which reduce the distance between the present and the past contexts of understanding?
4. Self-projection	How does the e-HS stimulate the visitors to project themselves into in the past so that the past gives meaning to their current conditions of existence?
5. Possibilities of being	Does the e-HS present the past "in terms of its many possibilities" so that the visitor is lead to wonder what specific historical characters could have done and what the constraints of their situation were?
6. Historical self	How does the e-HS help the visitors understand themselves as historically constituted so that they can learn the possible meanings of their existence from the values, actions and life situations of historical characters?
7. Inquiring being	Does the e-HS give an opportunity to the visitor to reflect "alternative modes of being", e.g. by investigating his or her own possibilities of existence or does the current era afford the kind of life that corresponds to what he or she feels is true and right?
8. Universality in uniqueness	Does the e-HS identify for the visitors how to see "the universal in what is historically unique" and thereby help them to see alternative possibilities for their own existence in the present?

Table 2. *An Interpretive Framework for the Evaluation of e-Heritage Systems*

4 ANALYSIS OF ARCHEOGUIDE SYSTEM IN OLYMPIA

We selected here a Mobile Computing Augmented Reality that is one of the most broadly quoted in the European reports and in the IT for archaeology research: the ARCHEOGUIDE system in Olympia (Gleue and Dähne, 2001). This system will be presented in a first sub-section. An evaluation will be provided in a second sub-section.

4.1 The ARCHEOGUIDE system in Olympia

ARCHEOGUIDE is a European IST project, aiming at providing a personalized electronic guide and tour assistant to cultural site visitors including GPS, WLAN, 3D binoculars and a portable laptop (fig. 1 A and 2B).

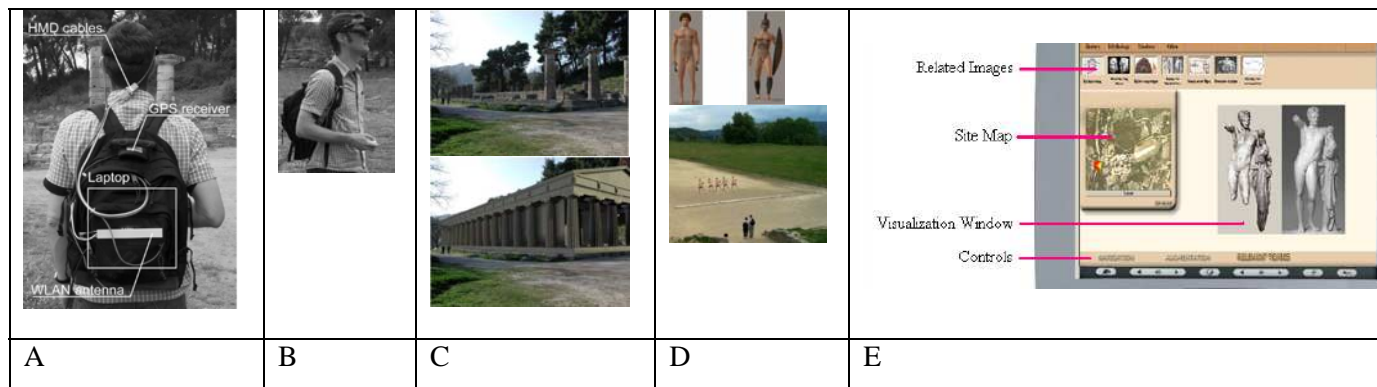


Figure 1. The ARCHEOGUIDE system in Olympia

The system provides on-site help and Augmented Reality reconstructions of ancient ruins, based on user's position and orientation in the cultural site, and real-time image rendering (fig. 1 C). Digital 3D characters (avatars) of ancient Greek athletes in augmented reality are playing different sports, e.g. racing (fig. 1 D). Finally the system incorporates a multimedia database of cultural material for wireless on-line access to cultural data, virtual visits, and restoration information. There is also a personal audio narration (fig 1 E).

4.2 Evaluation with the framework.

The context in ARCHEOGUIDE becomes not only temples in immersive 3D but also avatars (3D animated characters). However, this context is limited to representations. There is no reflexive experience of history. In ARCHEOGUIDE, there is a limited pre-understanding through personalization and a limited hermeneutic circle through inquiries. It misses maps, chronologies, information about the way people lived or about the relationships with other peoples. The historical agents are limited to the avatars. There is no re-enactment of an historical event. No doubt that there is here an immersive context. However, is it a reflexive experience of history? Of course there is a representation, but this representation is not a re-enactment because there is no historical event. There is just a landscape with temples and avatars playing mechanically the Olympic sports. Once again, the system does not allow the visitor to think himself into any action because there is no historical action. There is however a bodily experience through the immersion in Augmented Reality. The pre-understanding is assumed here because there is a customization of the system for both professional and recreational users. The hermeneutic circle seems to be present here through the comparison of the actual landscape and the virtual temple and avatars represented. But an hermeneutic circle is not a representation. It is an understanding of the part through the whole and the whole through the part. The whole would be here maps of the Hellenic world, chronologies, information about the way people lived or about the relationships with other peoples around the Greek realm. Once again, there is no other historical agents than the avatars, who seem to have no other function than to simulate the ancient sports without any subjective thinking of any real historical athlete.

On the phenomenological side, does "immersion" means "self-projection"? The "immersion" that the Augmented Reality system allows is simply to let us see the temples as they were supposed to be and some artefacts performing physical exercises. Where is the meaning? Do we ever learn that the Olympic games were created according to the mythology by Hercules, then perpetuated by the Gemini. That these kind of games were played in front of Troy as the Iliad tells us? Do we feel the stakes between Athens and the allied cities against the Persians in the Delos league? This immersion is not a self-projection. Nowhere, the condition, the situation, the possibilities of the ancient Greek athlete is described from inside. We see them running. That's all. We do not get into their thinking or their feeling. Therefore, we cannot project ourselves in the past existence so that the past existence gives meaning to ours. We do not understand the past "in terms of its possibility" because we cannot wonder what historical characters could have done, its constraints, its situation. We do not understand ourselves as historical. Nor we become "inquiring being" or see the "universal in what is unique"

because we have not access to the constraints of the situation nor to the possibilities of existence (Table 3).

<i>Criteria</i>	<i>ARCHEOGUIDE in Olympia</i>
1. Re-enactment	Limited: Digital 3D characters (avatars) of ancient Greek athletes in augmented reality. Personal audio narration
2. Embodiment	Partly developed: Augmented Reality binoculars with 3D virtual temples and avatars
3. Context	Limited: Mobile augmented reality digital guide for outdoor archaeological site with 3D virtual temples. Limited pre-understanding through Mobile Unit queries. Limited hermeneutic circle.
4. Self-projection	Limited to reconstitutions of historical buildings and scenes in physical or virtual models and using avatars to represent hypothetical historical characters acting in the reconstitutes scenes.
5. Possibilities of being	No
6. Historical self	No
7. Inquiring being	No
8. Universality in uniqueness	No

Table 3. *Evaluation of the ARCHEOGUIDE system*

Therefore, this e-Heritage system could not claim to be an Interpretive Archaeology System

5 CONCLUSION

The purpose of this paper was to propose a framework for the analysis of users expectations based on an interpretive and phenomenological perspective. We are quite aware that our proposal is in some sense too “radical” because it deviates too much from what is current practice. What we are proposing is not only new to IAS, but also extends the currently accepted perspectives in interpretive information systems research. We did point out that phenomenology entered the discussion of *research methods* as early as in 1985, but this early work was primarily based on Husserl and Gadamer, that is it did not include Heidegger. Introna and other have contributed important groundwork on Heidegger to IS research, but it is primarily of a conceptual nature and the question of relevant applications of the conceptual treatment is left open. Moreover, in spite of the ground-breaking work referenced, the phenomenological point of view has not received the widespread reception in the mainstream research community concerned with issues of requirements determination and information systems evaluation or assessment. Therefore our current research had to be limited to testing whether the ideas proposed here can get a sufficiently broad base of interdisciplinary acceptance. Once this modest goal has been met, we shall extend the framework into the area of systems development methods and tools to examine how prototypes can be built that demonstrate the practical feasibility of the concepts proposed here.

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